

of our country, and consequently any records or facts connected with them have a charm both for the forester as well as for the general reader. Dr. Brown's book on "The Forests of England" is therefore far from dry reading, treating as it does of such well-known forests and parks as Sherwood, Epping, Dean, and the New Forests, Woolmer, Whitebury, Windsor, Malvern, Cannock, and Hatfield Chases, &c.

A good deal of attention is being directed at the present time to the preservation of our forests in their natural beauty, and we should hope that Dr. Brown's books will at least have the effect of sharpening the interest of those who have hitherto been indifferent about the works of draining and planting that are always ready to be put forward as improvements, but which are for the most part of a character that should not be allowed to be carried out without deep and serious consideration by those qualified to advise.

"French Forest Ordinance" is a book of a more practical character than the preceding, inasmuch as it deals more with forest treatment and legislation in France, nevertheless it contains much of interest. The following extract from Chapter III. will explain: "It has been mentioned that the forests were exploited at that time [middle of seventeenth century] on a system of exploitation known as *jardinage* or *foretage*. The method of exploitation so designated is that which is generally followed in the management of woods in England, and of forests in our colonies—felling a tree here and there, and leaving the others standing—and is called in French forest economy *jardinage*, or gardening, from its similarity to the procedure of a gardener gathering leeks, onions, turnips, carrots, cabbages, or cauliflowers—taking one here and there, not at haphazard, but with some principle for his guidance—it may be to thin them—it may be to gather in the mature, and leave the others to grow; and called *foretage*, or ferreting, from the similarity of the woodman's procedure in seeking out what trees to fell—to what is called, from the conduct of a ferret, ferreting out what is wanted when it does not at once appear."

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.]

"Waterspouts" on the Little Bahama Bank—Whirlwind at Grand Cayman

WE have received the following communication, by an officer of H.M. surveying vessel *Sparrowhawk*, employed in the West Indies, from the Hydrographer to the Admiralty:—

Being much interested in the subject of waterspouts and their formation, and having failed to find anything about them in the works of recognised authorities, I venture to record some personal experiences together with what information I have been able to collect from the inhabitants of Alaco and the adjacent bays.

During the summer months waterspouts are common on the Little Bahama Bank. I have seen seven at once in water varying from ten feet to over a hundred fathoms, and I am informed that fifteen have been observed.

I have noticed that the first movement which eventually produces a waterspout is a whirlwind on the surface of the water gradually increasing in velocity of rotation and decreasing its diameter as it travels along before the prevailing wind. The spray is lifted to a height of from five to ten feet, and then gradually melts away, assuming the appearance of hot air, which is visible (still rotating) to a similar height above the spray. A motion amongst the clouds soon becomes apparent, a tongue is protruded, and the spout becomes visible from the top downwards.

On one occasion a portion of a spout appeared for a moment in mid air above the disturbance on the surface of the water.

Although these appearances are commonly called "waterspouts," I am informed by men who have been caught in them that they contain no water, and should be properly called "wind-spouts;" the small fore-and-aft-rigged schooners that ply on the bank do not fear them, although a prudent captain would probably shorten sail to one. I have been unable to hear of an accident having occurred through a vessel being caught in a waterspout.

They frequently cross the land, but no water falls; they take up any light articles, such as clothes spread out to dry, straw, &c., that happen to be in their course, but have never been known to carry anything along with them for a distance.

At Grand Cayman Island I noticed a whirlwind on the water, of somewhat similar appearance to those of the Little Bahama Bank just mentioned, though there was no cloud above it; the place where it appeared was a sheet of shoal water between the fringing reef and the shore, about one cable in breadth and three to ten feet deep. The whirlwind passed about fifty yards from where I stood; its estimated diameter was fifteen feet, and it whirled rapidly from left to right; the spray was lifted from the surface in a revolving sheet to a height of ten feet, but appeared to get thinner towards the top, and gradually melted away till it looked like the air over a boiling cauldron visible to a height of ten feet above the spray. I estimated its rate of progression at five knots; the wind was light (force 2). The whirling spray made a continuous hissing noise like a fast boat under sail passing close; it caused no particular wave on the beach and left no wake; its character was unchanged for half a mile, when I lost sight of it by its passing a point.

The inhabitants informed me that in their memory several whirlwinds had passed, but none had been known to cross the land.

MORRIS H. SMYTH

A Remarkable Meteor

A METEOR was seen at Hendon on the 6th inst., at 8.53 p.m., in a clear sky, and broad daylight. The course by compass was from north-east to east, at an altitude of about 27° above the horizon when first seen, and 22° when it disappeared, after being visible six or seven seconds. I drew the attention of a friend, in whose garden we were standing, to it. He saw it about three seconds, and compared it to a stream of fire. I learnt later that it was also seen by parties boating on the waters at the Welsh Harp, but could not get any particulars beyond the fact that it was seen. Its passage appeared attended by intense combustion. It first appeared as a circular ball of fire, but speedily lost a spherical shape, and became pointed, resembling somewhat a spear head, as though the change in appearance were due to the resistance of the atmosphere. From a deep red at first it became of a decided golden colour, to change to a brilliant white just before or as it disappeared. There was nothing special about the disappearance.

P. F. D.

London, W.

The Function of the Sound-Post in the Violin

I READ with much interest the part of Dr. Huggins's paper which relates to the above subject, having myself tried numerous experiments in the same direction. The conclusions I arrived at do not so much differ from those set forth in the paper, as that I venture to think they go a step further. It is on this plea that I ask for the acceptance of the following observations:—

It is undoubtedly true that the sound-post of a violin does communicate the vibrations from the belly of the instrument to the back; but, as will be hereafter seen, these vibrations are not of an order to reinforce the *sound* except to a limited extent. By far the most important function of the sound-post is that it acts as a prop to the belly in such a position and in such a manner as to enable the latter to give out a more resonant *order* of waves. The back may, and does, give out a modicum of sound, but it is especially the belly which becomes more resonant under the influence of the prop than without it.

In the first place, when the sound-post is removed, the belly of the violin is then an uninterrupted elastic table with a vibration rate of its own, its greatest elasticity being just at the part where the bridge is situated. Now it may safely be predicted, without resorting to experiment, that this specific rate of vibration of the belly itself will interfere with the varying rates of vibration communicated to it by the strings. That it is so, however, I have conclusively proved by actual experiments in great

variety, and when such interference takes place the tone is always meagre, as described by Dr. Huggins.

But it will naturally occur that there must be *one* note in the scale of the instrument which will coincide in its vibrations with those of the belly when in this unsupported condition, and that this note ought to be exceptionally loud. It is so in fact, but not to the extent that might at first be supposed. This is because in reality, as I shall try to explain, the injurious effect of interference does not include the whole question. When a tuning-fork is struck and held out of contact with a resonant body, it gives out a very feeble sound. The cause of this, as is well known, is that each half-wave is compensated and partly annulled by the succeeding half taking place in the opposite direction. A string stretched between two non-resonant supports does the same when plucked or bowed in the middle. In like manner, the belly of a fiddle, when unsupported by a sound-post, is under conditions which are very similar to those of the string. The most yielding part is immediately beneath the bridge, under the impulses of which every point of every longitudinal fibre moves up and down in the *same phase*, and every half-vibration cancels the effect of the half immediately preceding. The sound is correspondingly feeble. The wave, in fact, is not a true one. It is a to-and-fro, self-compensating motion all along the line. If the bridge were placed near one end of the instrument, the case would be different. Its nearness to a support or fulcrum on one side would cause the free part on the other side to break into a wave of progression, which is the true dynamic sound-giving wave. The office of the sound-post is precisely this. It forms a node at a particular part under the influence of which the wave is converted into one of *contrary phases* all over the surface. Such a wave travels in wood at amazing rapidity, and the consequence is that every half vibration reaches its limit and strikes the air almost before the other half has commenced its career, and therefore before it has had time to interfere with its dynamic effect. The best position of the node is found to be just behind the E string, because the higher the note the greater is the firmness required. The G string is further removed from the support, because the lower notes require greater freedom of motion, but it still partakes of its advantages.

I have never met with a satisfactory explanation of the cause of resonance in sound-boards. It cannot be due to extended surface in the sense that there are more extended vibrations or more numerous ones, because the greater the quantity of matter put in motion the more is the motion diluted. The investigation is practically a difficult one, owing to the extreme minuteness of the oscillations which have to be traced, but so far as the experiments indicate which I have been able to devise, the true cause does seem to be what I have been endeavouring to explain. A resonant wave is a *travelling wave*—the crest is always in advance of the depression, and expends itself dynamically before the latter has time to neutralise it. On the other hand, the depression succeeds in due order and produces a similar effect. It is in this sense only that an extended surface is useful and necessary.

If we need confirmation of the principle thus advanced, we have it in every wind instrument without exception. The type of all such instruments is the reed, the only difference being that in some it is aerial, and in others substantial. Take therefore an ordinary harmonium reed, and vibrate it with the finger. However elastic it may be, the sound is of the feeblest character. The double vibration is a compensated one—but let a current of air traverse the point of disturbance, the reed then speaks, or rather the current of air speaks. The half vibration has proceeded so far from its origin that it expends its dynamic force before the succeeding half is able to reach and neutralise it—the crest of the wave, as it were, has smitten the shore, before the depression has had time to overtake it. The depression then succeeds and does its own work.

R. HOWSON

Middlesbrough

Waking Impressions

THE accompanying experience may be of interest to some of your readers; and that it may be the more genuine in the recounting of it, I copy the little entry I made in my notebook some few hours only after the occurrence, as it was so distinctly impressed on my mind that I could not but be struck by it as being worth taking note of.

I have not unfrequently been on the point of noting down

similar visual impressions between sleeping and waking time, but have hitherto always found that they were really of so fugitive a nature, or the mind so little sensitive as not to be retentive, that the mere effort to recall them and put them into uttered words (whether audibly or only mentally uttered) was quite sufficient to dispel the impression totally; though by a long directing of the memory I could sometimes *nearly* recover it, not perfectly enough, however, to feel confident that imagination had not added somewhat to the picture. But the present case has been so vividly impressed on my mind that it has been fairly caught, to my own satisfaction at any rate, and I hope that it may be not unworthy of a corner in your valuable paper.

Reigate, July 13

"This morning I woke up suddenly with the end of a dream and found myself reading, as if from a printed book, only there was no book, merely printed words, thus: '*So while he was enjoying himself at . . . she was in deep depression at Kaj-ro.*' The '*Kaj-ro*' looked quite right, and I quite naturally pronounced it Cairo, and knew I meant that town. I was so struck by the clearness of the visual impression that, for fear of losing it, as one generally does, I instantly recounted the thing to my husband; but in the uttering of it when wide awake I could not at the moment, *even so soon* after the dream, recollect the name of the other locality (marked here by '*. . .*'), though I knew that it had been printed and read by myself in the dream. But about four minutes later, as we were talking it over, I said, '*It is so strange, for I'm sure I've not been talking or thinking either of Beloochistan or Cairo!*' and at once it flashed upon me that Beloochistan had been the other name, and I had then and there reseen the impression after an interval of total oblivion of it.

"There had been no idea of book or sheet to carry the printing, nor, I fancy, even *solidity* of any kind in the letters; but that the whole phrase was conveyed to my mind through a printed form and by a process of reading I am quite certain. We were on a visit, and the night before had been greatly entertained by the conversation of our host, who had been a great traveller, and we had certainly talked much of India, Cashmere, and Assam; but as far as I can now, or could then, recollect, we had most certainly *not* mentioned either Beloochistan or Cairo, nor had I been reading a novel before going to sleep or during the previous day."

Collingwood, Hawkhurst, July 14

J. MACLEAR

Tertiary Corals

I SHALL be obliged if you or any of your readers would kindly inform me the best authority to consult on the tertiary corals of Piedmont and Liguria; also the age of the beds in the lower part of Val d'Andona.

W. E. BALSTON

Bearsted House, Maidstone, July 15

Wild Fowl and Railways—Instinct and Intelligence

I AM happy to find that my experience of "ducks and railways" is confirmed by so high an authority as Mr. Goodsir from observations made on the other side of the world. Agreeing so far, we differ as to the cause by which the birds are influenced, Mr. Goodsir attributing it to "quick and unerring instinct," whilst I credit the ducks with "quick intelligence" or reasoning powers. If caused by the "teaching" of instinct, the ducks should show no alarm on the sudden and first appearance of a smoking, roaring train in their midst. They certainly do at first show alarm, but as they receive no injury, their intelligence teaches them, after a brief experience, that there is no danger.

I may perhaps be permitted to give one of many instances known to me of the quickness of birds in acquiring a knowledge of danger. Golden plover, when coming from their breeding-places in high latitudes, visit the islands north of Scotland in large numbers, and keep together in great packs. At first they are easily approached, but after a very few shots being fired at them, they become not only much more shy, but seem to measure with great accuracy the distance at which they are safe from harm; the sportsman, however, not unfrequently takes an unfair advantage of them by loading with a wire cartridge, which adds twenty yards or so to the distance at which the gun will kill when charged in the ordinary way.

It would be easy to adduce many cases of what may be considered pure and true instinct, of which the following is perhaps not a bad example, and not unworthy of mention, if it has not already appeared in the columns of NATURE or elsewhere:—